

STANDARD HOUSE MOUSE ACUTE TECHNICAL AND  
CONCENTRATED DRY BAIT LABORATORY TEST METHOD

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OPP Designation: 1.226 (5-6-76)

1. Scope

1.1 This method is designed to determine effectiveness of dry bait technical and concentrated acute rodenticide products used for control of house mice. It is applicable in connection with registration and enforcement procedures under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended. The conduct of, reporting of, and recordkeeping for studies conducted according to this method must conform with the U.S. Environmental Protection Agency's "Good Laboratory Practice Standards" (40 CFR, Part 160).

2. Test Animals

2.1 All mice used in this test shall be house mice (*Mus musculus*), wild-type (wild-caught or from a wild mouse colony) or albinos (Swiss-Webster strain preferred). They shall be healthy, active, and sexually mature, and shall fall within the following weight classes (in grams) within seven days prior to start of test:

	<u>Minimum</u>	<u>Maximum</u>	<u>Maximum acceptable differences in average weights between sexes</u>
Laboratory mice	15	35	5
Wild-type house mice	10	25	3

2.2 Ectoparasite control with registered insecticide (or acaricide) products labeled for use on laboratory mice is permissible if applied externally to both test and control animals not less than seven days prior to start of test, if applied at rates not exceeding those permitted by the registered label, and if the insecticide or acaricide used is not known or believed to potentiate the effects of rodenticide under study.

3. Apparatus

3.1 Mice may be housed individually or in single-sex groups of 5 or 10 mice per group. Mice should be placed in solid-bottomed, all-metal cages designed to hold laboratory mice or in specially constructed or modified cages suitable for maintaining house mice for this type of study. If mice are caged singly, each cage must have a bottom surface area of at least 500 cm<sup>2</sup>. If mice are group-caged, each enclosure must have a bottom surface area of at least 2000 cm<sup>2</sup> (2.15 ft<sup>2</sup>).

3.2 If subjects are group-caged, provide shelters in both the test and control cages. Empty soup or beverage cans, with one end removed, slightly flattened to prevent rolling, have been found satisfactory for this purpose. Use two cans for every five mice in the enclosure.

3.3 Metal or ceramic feeders, designed so that test mice may not nestle or wallow in diet, should be used.

4. Pretest Holding Conditions

4.1 All mice used in this test method must be held, sexes separate, for observation in the laboratory for a period of at least one and not more than four weeks prior to testing. During the last seven days of this period, mice shall be under laboratory conditions (i.e., temperature, humidity, lighting, etc.) comparable to those of the animal testing room if not actually in the testing room. The test animals must not be fasted prior to testing. Water and a commercial rat and mouse diet must be available to them at all times. Do not use the standard OPP rat and mouse challenge diet for pretest feeding.

5. Holding and Test Conditions

- 5.1 Temperature 20 to 25° C. Strong air currents from heaters or air conditioners shall not blow directly onto test animals.
- Relative humidity 50 to 55%.
- Light 12 h artificial light per day, not to exceed 2153 lx (200 ft candles) at cage location. Total reversing of the natural photoperiods of the test animals by timed lighting is not recommended.

5.2 The standard OPP rat and mouse challenge diet shall be composed of:

- Cornmeal (whole yellow ground corn) 65% by weight
- Rolled oat groats (ground) 25% by weight
- Sugar (10X powdered or confectioners, 95% + purity) 5% by weight
- Corn oil (95% + purity) 5% by weight

Mix dry ingredients together, add oil, and thoroughly mix. Be certain that the mixing utensils are clean of contamination before preparing diet.

5.2.1 The whole (not degerminated) yellow ground corn shall be from the most recently available crop and be reasonably freshly ground. Seventy-five percent (+ 5%) of the cornmeal shall pass through a No. 10 screen (10 meshes to the inch) and 50% (+ 10%) shall be retained by a No. 20 screen (20 meshes to the inch). The remainder may be either larger or smaller than the screens mentioned.

5.2.2 The oats shall be steam rolled oat groats (oat seed with the hulls removed) coarsely ground after the rolling process. Seventy-five percent (+ 5%) of the ground oats shall pass through a No. 5 screen (5 meshes to the inch) and 50% (+ 10%) shall be retained by a No. 20 screen (20 meshes to the inch). The remainder may be either larger or smaller than the screens mentioned.

5.2.3 The corn oil shall be of the type available as cooking oil, undiluted with other oils, and shall not be rancid.

5.2.4 The standard OPP rat and mouse challenge diet may be stored under refrigeration if it is to be used within three days of preparation. If it is to be held for longer periods, the diet shall be packaged in plastic containers [2.2 to 4.5 kg (5 to 10 lb) per container], tightly closed or sealed, and maintained at -18° C or below until it is to be used. Challenge diet shall be at room temperature when offered to test or control animals. Challenge diet shall not be prepared and stored for longer than six months.

5.3 Test baits made from a technical or a concentrate product should be formulated by combining the product with a mixture of ingredients suitable for comprising the "non-toxic" portion of baits used to control house mice. Baits meeting criteria in tests run according to this method should be prescribed on end-use product labels which bear bait mixing and application directions. The recipes provided in 5.3.1., 5.3.2., 5.3.3. and 5.3.4. may be used in preparing baits for tests run according to this method. Add technicals or concentrates at ratios appropriate for mixing baits used to control house mice. Active ingredient concentrations in test baits should correspond to those used for registered ready-to-use house mouse baits containing the same active ingredient.

5.3.1

White millet	25% by weight
Rolled oat groats	40% by weight
Cornmeal (whole yellow ground corn)	20% by weight
Anticoagulant concentrate	5% by weight
Sugar (10X powdered or confectioners, 95% + purity)	5% by weight
Corn oil	5% by weight
Technical or concentrate (reduce amount of oats used to adjust for weight of technical or concentrate added)	According to label

5.3.2

Rolled oat groats	50% by weight
Gram cracker meal	25% by weight
Sugar (10X powdered or confectioners, 95% + purity)	10% by weight
Cornmeal (whole yellow ground corn)	10% by weight

Corn Oil	5% by weight
Technical or concentrate (reduce amount of oats used to adjust for weight of technical or concentrate added)	According to label

5.3.3

White millet	35% by weight
Wheat flour	25% by weight
Lecithin-mineral oil (50:50 mixture)	5% by weight
Rolled oat groats	25% by weight
Sugar (10X powdered or confectioners, 95% + purity)	10% by weight
Technical or concentrate (reduce amount of millet used to adjust for weight of technical or concentrate added)	According to label

5.3.4

White millet	40% by weight
Corn oil	5% by weight
Corn meal (whole yellow ground corn)	44% by weight
Brewers yeast flakes (human food quality)	1% by weight
Sugar (10X powdered or confectioners)	7.5% by weight
Powdered milk (human food quality)	2.5% by weight
Technical or concentrate (reduce amount of millet used to adjust for weight of technical or concentrate added)	According to label

5.3.5. Combine dry ingredients together, add oil and thoroughly mix. Be certain the mixing utensils are clean of contamination before preparing diet. The corn, oats and corn oil shall comply to the specifications given in sub-sections 5.2.1, 5.2.2, and 5.2.3 for the OPP rat and mouse challenge diet. The white millet and gram cracker meal shall pass the same size specifications as for oats in 5.2.2 above.

6. Procedure

6.1 A test group consists of a minimum of 20 mice (10 males, 10 females), individually-caged or group-caged in single-sex subgroups of 5 or 10 animals

each. For each test or series of tests conducted at the same time, include one untreated control group of 20 mice (10 males, 10 females) caged in the same manner as the group(s) to be exposed to toxic bait. Acclimate all animals to test conditions for three days prior to exposure to toxicant, immediately following pretest holding period (4.1).

6.2 Water must be available to each animal at all times. Glass water bottles equipped with ball-type watering tubes are recommended. Gravity fed automatic or open-cup type waterers are not recommended.

6.3 The rodenticide-treated food and the standard OPP rat and mouse challenge diet must be offered to test mice in separate containers (3.2). If mice are caged individually, one container of each food must be used. Containers must be identical in type and size and must be placed on opposite sides of the front of the cage, equidistant from the sides of the cage, and equidistant from the rodent's point of access to water. If mice are group-caged, at least one container must be used per diet for every five animals in the cage. If one container is used per diet, the containers must be equidistant from the enclosure walls and the water source(s). If two or more containers are used per diet, containers shall be presented in pairs (one of test bait and one of challenge diet). Container pairs shall be deployed such that proximity to walls, shelter, or water sources dictates no clear advantage to either container position. The food offered in each container should be equal and consistent throughout the test and must be at least 15 grams per container, per animal, per day. The control group is offered only the OPP rat and mouse challenge diet, which shall be presented in amounts and numbers of containers equivalent to those used for the test group. The gross weight of each container and its contained food are determined daily and returned to the starting weight by addition of the given food. If food becomes fouled by urine or feces, replace food in each container. Record each day the quantity of each food consumed during the preceding 24 h. Weighing accuracy must be at least to the nearest 0.5 gram for tests with group-caged subjects. Individual caging may not be used unless consumption can be established to the nearest 0.1 gram. Spilled food shall be recovered and weighed to establish exact food consumption data. Where food spillage is damp it shall be dried to approximately its original moisture content before weighing.

6.4 Reverse the position of the bait and standard OPP rat and mouse challenge diet containers in the cage every 24 h to offset possible feeding position preference of the mice. The test mice must have a free choice between treated and untreated food.

6.5 Animals on test should not be subjected to undue or unnecessary stress from noise or human activities (i.e., movement). Human activity within the animal test room shall be minimal.

## 7. Test Period

7.1 Maintain test period for 2 days, even if all mice exposed to toxic bait die in less than 2 days.

7.2 Remove dead mice daily, or more frequently as observed.

7.3 Remove toxicant-treated food at the end of the 2-day bait-exposure period, leaving and maintaining the untreated food.

7.4 More than a 10% mortality in the control group negates the test, even if a 100% mortality had been achieved in the test group.

7.5 This laboratory efficacy test should be replicated at least once.

#### 8. Test Period Follow-Up

8.1 Maintain observation on surviving test group and control group mice for a minimum of five days following test period.

8.2 Continue feeding OPP rat and mouse challenge diet and recording amounts consumed daily.

8.3 Describe unusual activities of test and control mice in report of test and posttest periods.

#### 9. Calculation and Evaluation of Results

9.1 Record the date, the weight, and the sex of each mouse dying during the test and of survivors in both the test and control groups. Record the amounts of treated and untreated food consumed during the test and posttest periods. Report all data collected, including initial and final weights of test and control group subjects. Include copies of all "raw" data sheets as well as typed numerical summaries of test results. Indicate the composition of the bait prepared for the test, including the amount of each ingredient that was used and the percent of the bait comprised by each ingredient.

9.2 The product is considered to have performed satisfactorily if at least 90% of the test group animals die during the 7-day test and if no more than 10% of the control group subjects die during the 7-day test.

9.3 The test report must include reports of chemical analyses of the technical or concentrate product used, the test bait made from the technical or concentrate product used, and the challenge diet for the active ingredient claimed to be in the technical or concentrate product. These tests must be conducted according to methods acceptable to the U.S. Environmental Protection Agency.